

Condition of Benthic Macroinvertebrate Communities and Toxicity of Sediments in the Buffalo River Area of Concern Following Remediation of Contaminated Sediments

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Background/Objectives. The United States and Canada agreed to restore the chemical, physical, and biological integrity of the Great Lakes ecosystem under the first Great Lakes Water Quality Agreement in 1972. Through this framework, 43 Areas of Concern (AOC) were designated in the U.S. and Canada, with as many as 14 Beneficial Use Impairments (BUIs) identified in each AOC. In the Buffalo River AOC, several BUIs including “Degradation of Benthos” are directly related to contaminated sediments. As part of the AOC’s Remedial Action Plan, sediments were capped or removed from several highly-contaminated reaches between 2011 and 2015. The objective of the research presented herein was to determine if dredging improved the quality of sediments and condition of macroinvertebrate communities two years post-remediation.

Approach/Activities. Macroinvertebrate samples were collected using multi-plate artificial substrates and sediment samples were collected using a petit ponar dredge at eight sites in the Buffalo River AOC and at six reference sites upstream of the AOC during summer 2017. Macroinvertebrate samples were assessed with a multimetric index of biological integrity and sediment samples were used in 10-day toxicity tests with *Chironomus dilutus* and *Hyallela azteca*. Results will be used to determine whether the condition of macroinvertebrate communities and the toxicity of sediments differed between the AOC and surrounding reference areas.

Results/Lessons Learned. Preliminary results indicate the toxicity of sediments was similar between AOC and reference areas and was generally low in most samples. The condition of macroinvertebrate communities indicate moderate impact at both AOC and reference sites but was slightly better at reference sites which may be attributable to habitat differences. A second round of sampling is necessary before BUI removal may be considered, although multiple lines of evidence generally indicate that the condition of benthos and sediment toxicity in the Buffalo River AOC are similar to regional (non-AOC) conditions.